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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,005	09/09/2003	James Robert Champion	FOM-139.03	2289
25181	7590	06/07/2005	EXAMINER	
FOLEY HOAG, LLP PATENT GROUP, WORLD TRADE CENTER WEST 155 SEAPORT BLVD BOSTON, MA 02110			CHERRY, STEPHEN J	
			ART UNIT	PAPER NUMBER
			2863	

DATE MAILED: 06/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/658,005

Applicant(s)

CHAMPION, JAMES ROBERT

Examiner

Stephen J. Cherry

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 March 2005 and 11 April 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2 and 4-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Drawings***

The drawings were received on 3-7-2005. These drawings are acceptable.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1 and 3-25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicant claims a first and second conductor which will reflect a mismatch at dielectric mismatch, as depicted in figure 2 and further described as a "parallel conductor transmission line structure" in claim 6. Claims further recite, "a transmitter operable to drive the first electromagnetic signal along the first conductive element without also driving the second conductive element". Thus, the first and second conductors, being in physical proximity to each other, without a further shielding element disclosed form an approximation to a transmission line with respect to each other. Because of this, a signal applied to one of the conductors will also drive the second conductor. Evidence of this assertion is presented in "The ARRL Handbook for Radio Amateurs", which presents a model of a two conductor transmission line at page

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16-1, figure 2. From this figure, it is evident that through capacitive and inductive coupling, each of the two conductors are inextricably linked. Thus, without some undisclosed measures, it is not possible to drive one of the conductors without driving the other.

***Claim Rejections - 35 USC § 102***

For purposes of examination, because of the 35 U.S.C. 112 rejection above, references in the claims to driving a first conductor without also driving a second conductor will not be considered limiting.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 4-9, 12-20 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,137,282 to Macke, Sr. et al.

Claim 1 recites, as anticipated by Macke:

Claim 1 recites, as anticipated by Macke

1. A system for measuring distances, the system comprising:  
a first conductive element ('282, figs. 4-5, 304 and 408), and a second conductive element so disposed with respect to each other that, when the first and second conductive elements extend through a dielectric

mismatch boundary, a first electromagnetic signal will induce a second electromagnetic signal to propagate along the second conductive element ('282, figs. 4-5, 306 and 410);

a transmitter operable to drive the first electromagnetic signal along the first conductive element without also driving the second conductive element; and a receiver operable to receive the second electromagnetic signal ('282, col. 4, line 66); and a processor operable to determine, at least in part from a time delay between the first and second electromagnetic signals, a distance associated with the dielectric mismatch boundary ('282, fig. 1).

Claim 2 recites, as anticipated by Macke

2. The system of claim 1 wherein the first electromagnetic signal exhibits an ultrawideband frequency ('282, col. 3, line 5, "pulse" contains broad range of spectral content).

Claim 4 recites, as anticipated by Macke

4. The system of claim 1 wherein the receiver is further operable to detect the time delay between the first and second electromagnetic signals ('282, fig. 1, 20 and 22).

Claim 5 recites, as anticipated by Macke

5. The system of claim 4 wherein the receiver includes an equivalent time sampling circuit ('282, fig. 1).

Claim 6 recites, as anticipated by Macke

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6. The system of claim 1 wherein the first and second conductive elements form a parallel conductor transmission line structure ('282, col. 4, line 66).

Claim 7 recites, as anticipated by Macke

7. The system of claim 1 wherein the first and second conductive elements are flexible ('282, col. 3, line 54).

Claim 8 recites, as anticipated by Macke

8. The system of claim 1 wherein the first and second conductive elements exhibit quadrilateral cross-sections ('282, 304 and 306, cross section taken lengthwise).

Claim 9 recites, as anticipated by Macke:

9. The system of claim 1 wherein the first and second conductive elements exhibit substantially identical cross-sections (282, figs. 4 and 5).

Claim 12 recites, as anticipated by Macke:

12. The system of claim 1 wherein the distance determined by the processor corresponds to a dimension associated with an object ('282, fig. 5, distance corresponds to width of portion 404).

Claim 13 recites, as anticipated by Macke:

13. The system of claim 1 wherein the distance determined by the processor corresponds to a displacement between a plurality of objects ('282, fig. 4, distance corresponds to displacement between buttons 310a-310f).

Claim 14 recites, as anticipated by Macke:

14. The system of claim 1 wherein the distance determined by the processor corresponds to an angular orientation ('282, col. 3, line 54, buttons in curved path would have an angular relationship to one another, rather than the linear relationship shown in figs. 4-5).

Claim 15 recites, as anticipated by Macke:

15. The system of claim 1 wherein the distance determined by the processor corresponds to a degree of pressure ('282, fig. 4, signal corresponds to pressure on buttons).

Claim 16 recites, as anticipated by Macke:

16. A method of measuring distances, the method comprising:  
driving a first electromagnetic signal along a first conductive element without also driving a second conductive element, where the first and second conductive elements are so disposed with respect to each other that, when the first and second conductive elements extend through a dielectric mismatch boundary, a first electromagnetic will induce a second electromagnetic signal to propagate along the second conductive element ('282, figs. 4-5, 304-306 and 408-410); receiving the a second electromagnetic signal ('282, fig. 1, signal received by 16); and determining, at least in part from a time delay between the first and second electromagnetic signals, a distance associated with the dielectric mismatch boundary ('282, fig. 1 and col. 3, line 5).

Claim 17 recites, as anticipated by Macke:

17. The method of claim 16 wherein the distance corresponds to a dimension associated with an object ('282, fig. 5, distance corresponds to width of portion 404).

Claim 18 recites, as anticipated by Macke:

18. The method of claim 16 wherein the distance corresponds to a displacement between a plurality of objects ('282, fig. 4, distance corresponds to displacement between buttons 310a-310f).

Claim 19 recites, as anticipated by Macke:

19. The method of claim 16 wherein the distance corresponds to an angular orientation ('282, col. 3, line 54, buttons in curved path would have an angular relationship to one another, rather than the linear relationship shown in figs. 4-5).

Claim 20 recites, as anticipated by Macke:

20. The method of claim 16 wherein the distance corresponds to a degree of pressure ('282, fig. 4, signal corresponds to pressure on buttons) .

Claim 22 recites, as anticipated by Macke:

22. The system according to claim 1, wherein the first electromagnetic signal propagates from a first end of the first conductive element toward a second end of the first conductive element, and the propagation of the first



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electromagnetic signal through the boundary will induce the second electromagnetic signal to propagate along the second conductive element toward a first end of the second conductive element ('282, fig. 4 and col. 4, line 66).

Claim 24 recites, as anticipated by Macke:

24. The method according to claim 16, wherein the first electromagnetic signal propagates from a first end of the first conductive element toward a second end of the first conductive element, and the propagation of the first electromagnetic signal through the boundary will induce the second electromagnetic signal to propagate along the second conductive element toward a first end of the second conductive element ('282, fig. 4 and col. 4, line 66).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 11, 21, 23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,137,282 to Macke, Sr. et al in view of U.S. Patent 6,307,380 to Hirai et al.

The claim recites, as disclosed by Macke:

a first conductive element ('282, figs. 4-5, 304 and 408), and a second conductive element so disposed with respect to each other that, when the first and second conductive elements extend through a dielectric mismatch boundary, a first electromagnetic signal will induce a second electromagnetic signal to propagate along the second conductive element ('282, figs. 4-5, 306 and 410);

a transmitter operable to drive the first electromagnetic signal along the first conductive element without also driving the second conductive element; and a receiver operable to receive the second electromagnetic signal ('282, col. 4, line 66); and a processor operable to determine, at least in part from a time delay between the first and second electromagnetic signals, a distance associated with the dielectric mismatch boundary ('282, fig. 1);

driving a first electromagnetic signal along a first conductive element without also driving a second conductive element, where the first and second conductive elements are so disposed with respect to each other that, when the first and second conductive elements extend through a dielectric mismatch boundary, a first electromagnetic will induce a second electromagnetic signal to propagate along the second conductive element ('282, figs. 4-5, 304-306 and 408-410); receiving the a second electromagnetic signal ('282, fig. 1, signal received by 16); and

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determining, at least in part from a time delay between the first and second electromagnetic signals, a distance associated with the dielectric mismatch boundary ('282, fig. 1 and col. 3, line 5).

Macke does not disclose a slidable element.

The claims further recite, as disclosed by Hirai:

a coupler slidable along the first and second conductive elements for so coupling the first and second conductive elements as to launch the second electromagnetic signal along the second conductive element when the first electromagnetic signal reaches the position of the coupler ('380, fig. 20, protective layer, 47 allows sliding of mismatch generator); further comprising a supporting material for slidably receiving the coupler in a channel defined therein, the supporting material maintaining a consistent displacement between the coupler and the first and second conductive elements ('380, fig. 20, protective layer, 47 allows sliding of mismatch generator).

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the invention of Macke with the sliding element of Hirai to allow liquid level to be measured ('380, fig. 20).

### ***Response to Arguments***

Applicant's arguments filed 3-7-2005 concerning claims 1-9 and 11-20 have been fully considered but they are not persuasive. Applicant argues that the prior art does

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not teach driving the first of the conductors of a pair of conductors without driving the second. As described above, it is the opinion of the examiner that because the disclosed structure of applicants invention can be modeled as a transmission line, it's characteristics would be that of a transmission line, thus a signal impressed on one of the conductors would be present on the other of the pair of conductors; thus, this functional language was not considered limiting.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

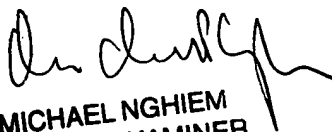
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Cherry whose telephone number is (571) 272-2272. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SJC

  
MICHAEL NGHIEM  
PRIMARY EXAMINER